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Spring 2021

## PHYS 102-002: General Physics

Keun Hyuk Ahn

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Course Outline  
Physics 102 Sect. 002  
Spring 2021  
**(Version 1, created on 1/18/2021)**

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Lecture and recitation for **Section 002**: Converged learning  
Monday 12:30pm – 1:50pm, GITC 1100 (**sit on seats with BLUE DOTS**)  
Wednesday 12:30pm – 1:50pm, GITC 1100 (**sit on seats with BLUE DOTS**)

Online office hour via Webex: 1pm-1:30pm and 1:30pm-2pm on Friday  
My Personal Webex Room  
Visit <https://njit.webex.com/meet/kenahnnjit.edu>  
Or find using Meeting number: 929 350 964.  
For the help on a first-come-first-served basis, simply visit My Personal Webex Room.  
To reserve a spot, email me by 5pm Thursday.

Course website: On Canvas. Login in through <https://canvas.njit.edu/>

**Pre- and Co-requisite Courses**

Prerequisite: Satisfactory completion of two high school mathematics courses and two high school science courses.

**Laboratory - Physics 102A**

The laboratory component of the course is Phys 102A. This laboratory course may be optional for your major; confirm it with your department. The grading for the laboratory is separate from the course/recitation (Phys 102) and the grades are given by the laboratory instructors. Please contact Phys 102A instructors for the course information. Latest edition of **Lab manual “Physics 102A Laboratory Manual”** can be purchased from NJIT Bookstore.

NJIT has determined that all labs require a “face-to-face/in-person” component. Because of this requirement, along with COVID operating conditions, the labs are not a co-requisite for the corresponding or for the subsequent lecture component of a class. *Also note that:*

- 1) If the student has an approved medical accommodation from the Dean of Students, the student can take the lab course entirely online.
- 2) If the student does not have an approved medical accommodation, then the lab cannot be taken online and has to be face-to-face or postponed to a later time.

Please contact Phys 102A instructors for further information.

**Course Materials**

**Textbook:**

**Physics - Principles with Applications, 7th ed.** by Giancoli (Publisher: Pearson)

Students may purchase e-textbook along with the access to the Mastering Physics Online Homework system. Or, students may buy a physical textbook, for example, from NJIT bookstore.

**Mastering Physics Online Homework System:**

You can buy the Mastering Physics student access code online. If you buy a physical textbook, you may buy the physical textbook bundled with a Mastering Physics student access code card. Homework

assignments will be posted on-line. Students login, download and solve the assigned problems, and submit answers to the automated grading system. **To enroll for this section of the course, use course ID “ahn00934”.**

### **Online Class Response System:**

We will use an **online** class response system called “**iClicker REEF**”. The iClicker quizzes must be answered with **iClickers REEF app on iPhone/Android phone/computer only. Physical iClickers cannot be used.** For those of you with **iPhone or Android Phone**, you can download an app “**iClicker REEF**” for your iPhone or Android Phone, and buy a subscription, which will turn your iPhone or Android Phone into an iClicker. Alternatively, you can sign into the iClicker Reef web app from your laptop, tablet, or smartphone, and buy a subscription. Either way, you have to buy a **paid subscription, instead of using it as a free trial.** Consult the iClicker web page <https://www.iclicker.com/> for details. You will need **the school zip code, 07102.**

### **Email:**

NJIT email will be routinely used for announcements and to distribute material. Be sure check the NJIT email every day.

### **Computer:**

Students are required to have access to a computer with high speed internet connection, webcam (internal or external), microphone and audio (internal or external), and Windows/Mac operating system. (Webcam and Window/Mac operating system are for online exams. Apple iOS does not work for online exams.)

### **Canvas:**

Canvas is used for the main course website.

Login through <https://canvas.njit.edu/>

### **Webex:**

Lecture/recitation will be given with Webex.

Check information on <http://ist.njit.edu/webex/>

### **Attendance**

Attendance at lectures and recitations, either online or in-classroom, is mandatory; it may constitute a portion of the final grade. Missing more than three lectures will be reported to the Dean of Freshman Studies throughout the semester and can result in failing the course. Students with absences need to discuss their extenuating circumstances for missing the classes with the Dean. Students are allowed to attend the course 100% online.

### **Exams**

There will be two midterm Exams and one Final Exam during the term. The exam schedule is:

Exam 1: Wednesday, February 17, 4:15pm – 5:45pm

Exam 2: Wednesday, March 24, 4:15pm – 5:45pm

Final Exam: To be announced

There will be no makeup exams.

**All exams will be given remotely through online, using an online proctoring service “ProctorU”. Students need access to a computer with high speed internet connection, webcam (internal or external), microphone and audio (internal or external), and Windows/Mac operating system.**

### **Grading**

Final grades will be based on a composite score for the term's work that includes Exam 1, Exam 2, Final exam, homework, iClicker REEF quiz, and class participation. The approximate weights we expect to use in calculating the composite score are:

- 23 % for Exam 1
- 23 % for Exam 2
- 35 % for Final Exam
- 12 % for Homework grade
- 7 % for iClicker REEF quiz + Class participation

Extra credit may be given for active class participation, etc. Negative credit may be applied for lateness, creating noise, or otherwise interfering with class work.

The cutoff percentages for various letter grades will be in the range of 84.0% for A, 76.0 % for B+, 68.0% for B, 60.0% for C+, 52.0% for C, 44.0% for D, F below 44.0 %.

**C or better grade is required to take further physics courses. If you get D in Physics 102, you cannot take the next level physics course.**

### **Reading Assignments**

The text readings are listed below. You should read the assigned sections of the text before the lecture covering that material.

### **Homework**

It is almost impossible to succeed in this course without working a lot of problems: do the homework. Each student must download the weekly homework assignments from Mastering Physics online homework system, work the problems, and submit the solutions online before each assignment is due. Late work will not be accepted. See Course Materials section above.

### **Honor Code Violations or Disruptive Behavior**

NJIT has a zero-tolerance policy for cheating of any kind and for student behavior that disrupts learning by others. Incidents will be immediately reported to the Dean of Students. The penalties for violations range from a minimum of failure in the course with disciplinary probation up to expulsion from NJIT. Avoid situations where your own behavior could be misinterpreted, even if it is honorable. Students are required to agree to the NJIT Honor Code on each exam. Turn off all cellular phones, wireless devices, computers, and messaging devices of all kinds during exams. Please do not create noise in class that interferes with the work of students or instructors.

### **Help**

Students are encouraged to meet with their instructor during their office hours. Physics Department also offers tutoring as will be posted on <http://physics.njit.edu/>.

### **Learning Outcomes:**

For this course, you can expect to be assessed on the following learning outcomes:

1. Recall the definitions and relationships involving position, velocity, speed, acceleration, vectors, Newton's Laws, circular motion, free-body diagrams, friction, work, energy, linear and angular momentum, torque, angular velocity and acceleration, and gravitation.
2. Apply the equations governing 1-D and 2-D constant acceleration to mechanical systems for various initial conditions. Calculate unknown quantities based on physical relationships, initial conditions, and known quantities.
3. Comprehend the meaning of the equations governing net force and acceleration (Newton's Laws), and be able to manipulate them in conjunction with a free-body diagram to obtain any

desired quantitative relationship. Understand the extension of these equations to rotational motion, and gravitation.

4. Generalize the concepts underlying the equations of motion, such as work, kinetic and potential energy, conservation of energy, and equilibrium.
5. Comprehend the meaning of equations governing momentum, impulse, and collisions. Apply the equations governing momentum, impulse, and collisions mechanical systems for various initial conditions. Understand under what conditions momentum is conserved and how to use this relation to calculate unknown quantities based on physical relationships, initial conditions, and known quantities.
6. Understand the extension of linear motion equations to rotational motion. Comprehend the meaning of the equations governing rotational motion and acceleration, and be able to manipulate them in conjunction with a free-body diagram to obtain any desired quantitative relationship.

**2021 Spring Course Schedule for Phys 102-002**

<b>Dates</b>	<b>Lecture Topics</b>	<b>Text Reading</b>
1/20 W, 1/25 M	Math Review, Introduction Measurement and Units	Appendix A-4, Ch 1, Sec 1-6
1/27 W, 2/1 M	Motion in One Dimension	Ch 2, Sec 1-8
2/3 W, 2/8 M, 2/10 W	Vectors and Two-Dimensional Motion	Ch 3, Sec 1-6
2/15 M, 2/17 W	The Laws of Motion - Forces and Newton's Laws	Ch 4, Sec 1-5
<b>2/17 W</b>	<b>Common Exam 1 (4:15-5:45pm)</b>	<b>Math review, Ch. 1 - Ch. 3.4</b>
2/22 M, 2/24 W, 3/1 M	The Laws of Motion - Applications of Newton's Laws	Ch 4, Sec 6-8
3/3 W	Circular motion	Ch. 5, Sec. 1, 2, 4 (excluding highway curves)
3/8 M, 3/10 W	Energy -Work, Kinetic Energy, Work-Energy Theorem	Ch. 6, Sec. 1, 3
3/22 M, 3/24 W	Energy -Potential Energy, Mechanical Energy, Energy conservation, Power	Ch. 6, Sec. 4-7, 9, 10 (excluding spring)
<b>3/24 W</b>	<b>Common Exam 2 (4:15-5:45pm)</b>	<b>Ch. 3.5-3.6, Ch. 4, Ch. 5.1, 5.2, 5.4</b>
3/29 M, 3/31 W	Momentum and Collisions -Momentum, Impulse, Conservation of Momentum	Ch. 7, Sec. 1-3
4/5 M	Momentum and Collisions -Collisions	Ch 7, Sec. 4-8, 10
4/7 W, 4/12 M	Rotational Motion, Rotational Dynamics I	Ch 8, Sec. 1-3
4/14 W, 4/19 M, 4/21 W	Rotational dynamics II	Ch.8, Sec. 4-8
4/26 M, 4/28 W	Static Equilibrium	Ch. 9, Sec. 1-4
5/3 M	The Law of Gravity	Ch. 5, Sec. 5-7 (excluding Kepler's Laws)
<b>Date to be announced</b>	<b>Final Exam</b>	Everything learned in class

**\* The professor will discuss changes to the syllabus during class if they arise.**